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(56) Documents Cited
GB 2329794 A **GB 2325592 A** **WO 98/57518 A1**
WO 98/25433 A1 **US 5532690 A**

(58) Field of Search
UK CL (Edition Q) **G4N NPL , H4D DAB DPBC , H4L**
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INT CL⁶ H04Q 7/32 7/38
Online: **EPODOC, WPI, JAPIO**

(54) Abstract Title
Location dependent disablement of apparatus

(57) An apparatus 100 is automatically disabled according to its location. The apparatus stores data 110, 112 representing its desired operating location. Current location information, which may be provided from a GPS unit 108 or other data received from transmitters, is compared with the desired operation locations and the apparatus enabled or disabled accordingly. The desired location data may be stored in encrypted form. The apparatus disabled may be a cellular phone, a television, a video recorder or a vehicle.

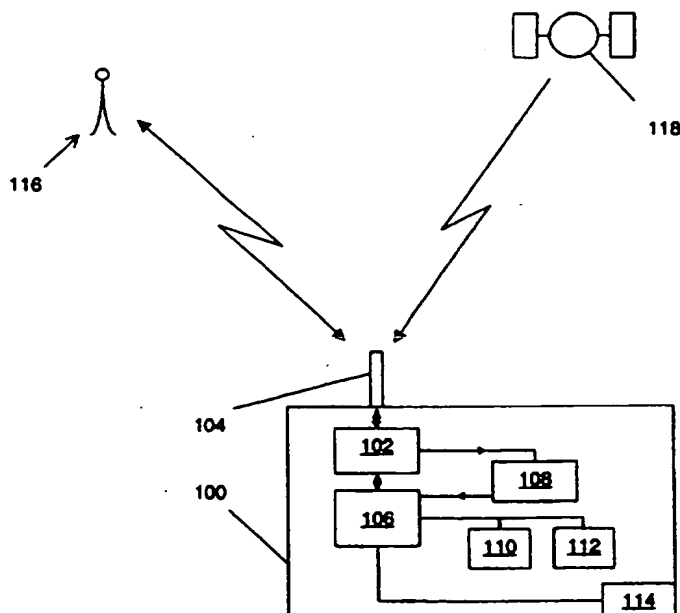


FIG. 1

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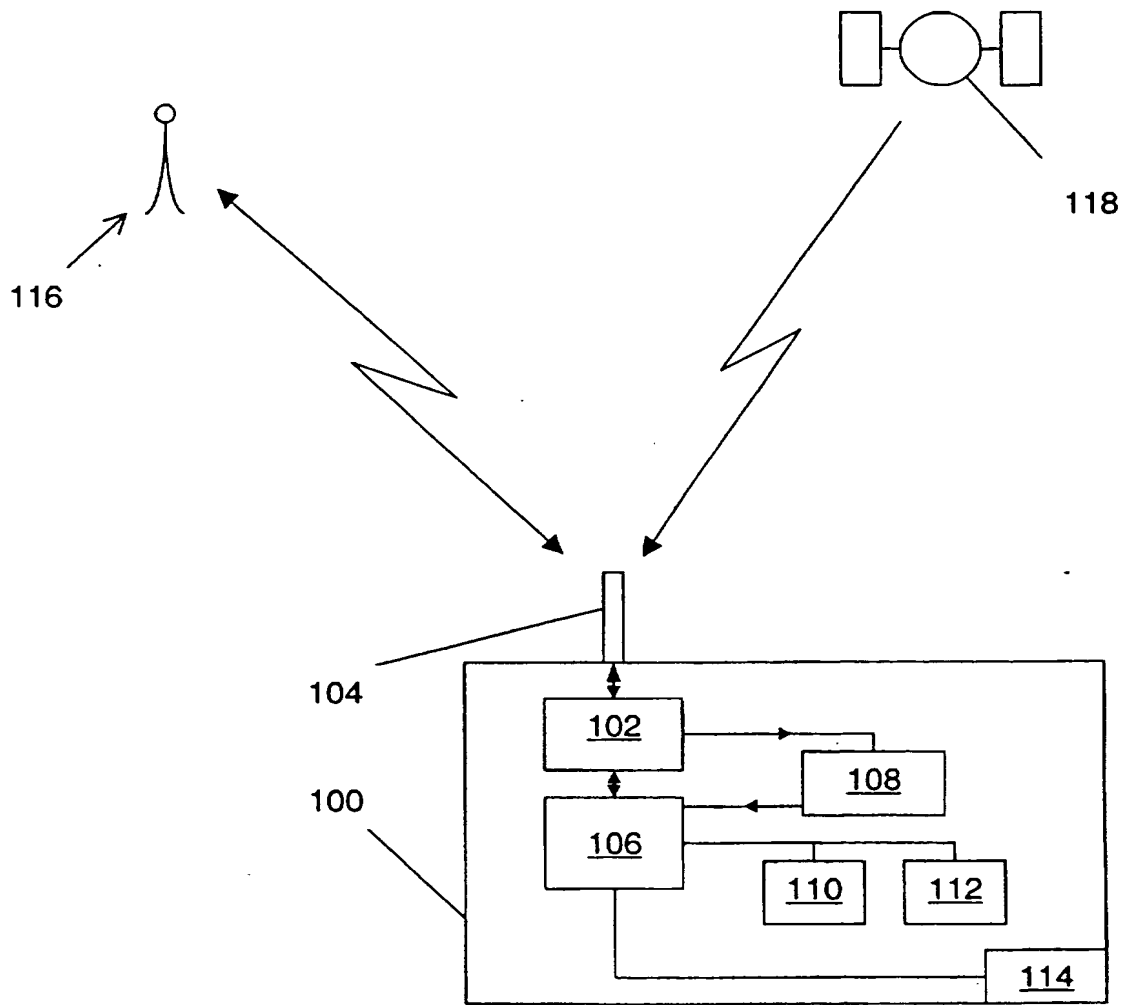


FIG. 1

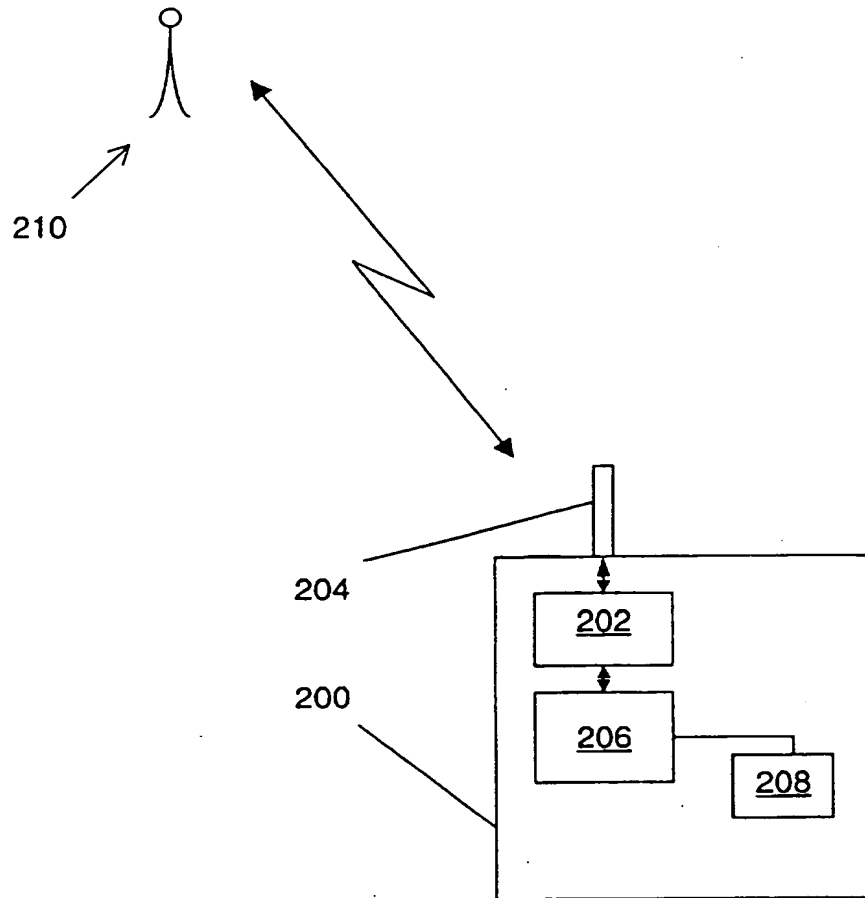


FIG. 2

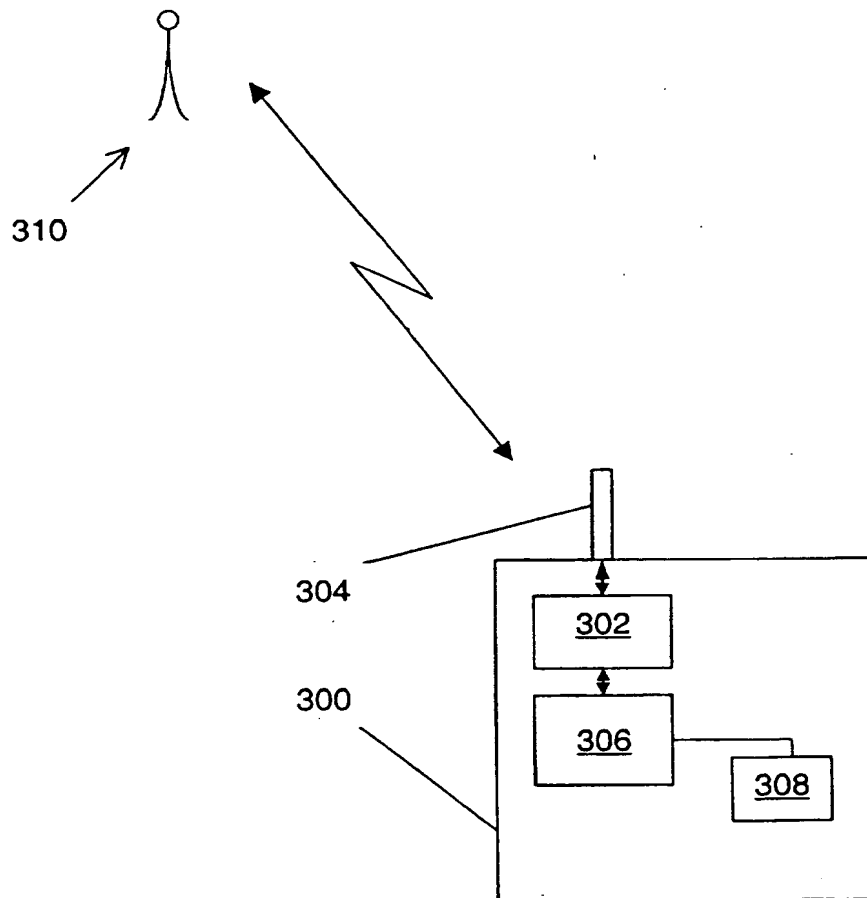


FIG. 3

APPARATUS AND METHOD FOR
AUTOMATIC LOCATION-DEPENDENT DISABLEMENT

5 Field of Invention ...

This invention relates to automatic disablement of devices, such as electronic equipment, dependent on device location.

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Background of Invention

In distributing products across different geographic areas, it is often desirable to control the marketing or use of products differently in different areas. For example, for marketing reasons, it may be desirable for electronic equipment such as a radio sold in a higher price area not to be used in a lower price area.

20 Alternatively, it may be desirable for technical or regulatory reasons for a device such as a radio designed for use in one area not to be used in another area.

A variety of measures are known which attempt to inhibit "grey" marketing (the marketing in one area of a product intended for sale/use in another area), including: regional type approval, regional model numbering, regional colouring, and regional naming/nomenclature. Unfortunately, none of these measures is primarily effective, and even a combination of such measures does not eliminate the problem but merely increases the difficulty for a "grey marketer".

Summary of Invention

In accordance with a first aspect of the present invention there is provided an apparatus as claimed in
5 claim 1.

In accordance with a second aspect of the present invention there is provided a method as claimed in claim 10.

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Brief Description of Drawings

Three embodiments of the invention will now be described with reference to the accompanying drawings,
15 in which:

FIG. 1 shows in block diagrammatic form a system including a radio incorporating the present invention;

FIG. 2 shows in block diagrammatic form a system including a cellular telephone incorporating the present invention; and
20

FIG. 3 shows in block diagrammatic form a system including a cellular telephone incorporating the present invention.

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Description of Preferred Embodiment

Referring firstly to FIG. 1, a two-way portable radio
30 100 includes transmit/receive circuitry 102 coupled to an antenna 104 and under the control of a microprocessor 106. The radio 100 also includes a Global Positioning by Satellite system (GPS) receiver

108, also under the control of the microprocessor 106.
As will be explained further below, the radio also
holds in integrated circuit memories 110, 112 data (for
example a latitude and longitude setting) representing
5 the desired operating area for the radio. The radio 100
also has a 'code plug' 114, via which particular
operating features of the radio (such as
transmission/reception frequencies, power levels, etc.)
are determined. In use, the radio 100 communicates with
10 a radio transmitter/receiver 116 and receives GPS data
from GPS satellites, only one of which 118 is shown.

Whenever the radio 100 is powered up, it determines its
geographic position from its GPS receiver 108. Stored
15 within the radio, in some protected area of the
memories 110 and 112, is one or more sets of
latitude/longitude co-ordinates defining a geographic
area within which the unit is permitted to operate.
This latitude/longitude information is created at the
20 manufacturing point. For added security, to prevent
tampering, this information could be encrypted. It will
be appreciated that by spreading the information across
different integrated circuit memories the security of
the information is enhanced, but that if desired the
25 information could be held in a single IC device.

Before a dealer hands over a radio to a customer, the
generic code plug data must be overwritten with the
information on radio channels, operational features,
30 etc., specific to that particular customer's
requirements, which must be stored in the radio using
Radio Service Software (RSS) or Dealer Programming
Software (DPS) installed on a personal computer (PC).

At this stage, the permitted operational area stored in the unit is compared, in the microprocessor 106, with the current geographical position, as determined by the GPS receiver 108, and if there is no match programming is inhibited and the product is rendered useless in that region. Additionally, the radio could incorporate its own self-checking routine to monitor its position and shut itself down if it found a mismatch. A radio programmed legally in its permitted geographic area could not subsequently be taken elsewhere for use.

Referring now to FIG. 2, even though no form of dealer programming is required and cellular telephones are intended for roaming anyway, a similar concept can be applied to cellular telephones. As shown in FIG. 2, a cellular telephone 200 includes transmit/receive circuitry 202 coupled to an antenna 204 and under the control of a microprocessor 206. The cellular telephone 200 also includes an integrated circuit memory 208 holding data (for example a latitude and longitude setting) representing the desired operating area for the cellular telephone. This desired positional data can be programmed into the memory during manufacture, or before a dealer hands over the cellular telephone to a customer. In use, the cellular telephone 200 communicates with cellular base stations, only one of which 210 is shown.

Whenever the cellular telephone 200 is powered up, it determines its geographic position from data in the signals received from the base station 210. It compares, in the microprocessor 206, this received position data with the data held in the memory 208.

representing the desired operating area for the cellular telephone, and if there is no match operation of the cellular telephone is disabled and the product is rendered useless. Additionally, the cellular
5 telephone could incorporate its own self-checking routine to monitor its position each time it establishes communication with a new base station and shut itself down if it found a mismatch. A cellular telephone programmed legally in its permitted
10 geographic area could not subsequently be taken elsewhere for use.

Thus, a cellular telephone intended for use in the United Kingdom, for example, would contain the
15 appropriate (U.K.) geographic data; if the phone were taken elsewhere in the world and registered for the first time on a compatible system, then the registration would fail and operation of the cellular telephone would be inhibited. The security of this
20 concept could be increased by randomising the registration attempt when the geographic check is performed, say some time within the first 50 calls, rather than the first time.

25 Referring now to FIG. 3, a similar concept can be applied to broadcast receiving equipment. As shown in FIG. 3, video equipment such as a television receiver or video recorder 300 includes receive circuitry 302 coupled to an antenna 304 and under the control of a
30 microprocessor 306. The television receiver or video recorder 300 also includes an integrated circuit memory 308 holding data (for example a latitude and longitude setting) representing the desired operating area for

the equipment. This desired positional data can be programmed into the memory during manufacture, or before a dealer hands over the equipment to a customer. In use, the television receiver or video recorder 300
5 receives television signals, from a television transmitter 310.

Whenever the television receiver or video recorder 300 is operational, it determines its geographic position
10 from data in the signals received from the television transmitter 310 (no additional form of location device being required). It compares, in the microprocessor 306, this received geographic data with the data held in the memory 308 representing the desired operating
15 area for the broadcast receiving equipment, and if there is no match operation of the equipment is either totally or partially disabled and the product is rendered less than fully functional. Additionally, the receiving equipment could incorporate its own self-
20 checking routine to monitor its position each time it receives a signal from a new broadcast transmitter and curtail its operation if it found a mismatch. Broadcast receiving equipment programmed legally in its permitted geographic area could not subsequently be taken
25 elsewhere for use.

Thus, broadcast receiving equipment intended for use in the United Kingdom, for example, would contain the appropriate (U.K.) geographic data; if the equipment
30 were taken elsewhere in the world any attempted use would result in the full functionality of the equipment being inhibited and the equipment would need to be taken to a service shop where full functionality could

be restored (assuming operation was authorised) or the appropriate authorities could be notified of potential "grey market" trading . The security of this concept could be increased by randomising the time when the geographic check is performed, say some time within the first few hours or days of operation, rather than immediately the equipment is powered up.

It will be appreciated that the basic concept described above could be applied to other forms of electronic equipment likely to be sold on a "grey market", for example radio broadcast receivers.

It will be further be appreciated that, if desired, the basic concept described above could be applied to equipment such as a vehicle immobiliser. Such an immobiliser could, for example, be fitted to a rental car, and could be arranged to immobilise the car (perhaps disabling the car to the extent of limiting its speed to, say, 5 miles per hour) in the event that the car is driven outside of a predetermined permitted area where insurance cover has been arranged.

Claims

1. Apparatus having means for automatic location-dependent disablement comprising:
 - 5 means for holding information representative of the desired operational location of the apparatus;
 - means for sensing the location of the apparatus; and
 - means for comparing the desired operational location of the apparatus with the sensed location of the apparatus
 - 10 and for disabling the apparatus when there is a substantial difference therebetween.
2. An apparatus as claimed in claim 1 wherein the means for holding information comprises a plurality of
15 integrated circuit memories across which the information representative of the desired operational location of the apparatus is held.
3. An apparatus as claimed in claim 1 or 2 wherein
20 the means for holding information holds the information representative of the desired operational location of the apparatus in encrypted form.
4. An apparatus as claimed in claim 1, 2 or 3 wherein
25 the means for sensing the location of the apparatus comprises a GPS receiver.
5. An apparatus as claimed in any preceding claim wherein the apparatus comprises a radio
30 transmitter/receiver.
6. An apparatus as claimed in any one of claims 1 to 4 wherein the apparatus comprises a cellular telephone.

7. An apparatus as claimed in any one of claims 1 to 4 wherein the apparatus comprises broadcast receiving equipment.

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8. An apparatus as claimed in claim 7 wherein the broadcast receiving equipment comprises a television receiver.

10 9. An apparatus as claimed in claim 7 wherein the broadcast receiving equipment comprises a video recorder.

10. A method for automatically disabling an apparatus
15 dependent upon the apparatus' location, the method comprising the steps of:
storing in the apparatus information representative of the desired operational location of the apparatus;
sensing the location of the apparatus; and
20 disabling the apparatus when the desired operational location of the apparatus is substantially different from the sensed location of the apparatus.

11. A method as claimed in claim 10 wherein the step
25 of storing information comprises storing across a plurality of integrated circuit memories the information representative of the desired operational location of the apparatus.

30 12. A method as claimed in claim 10 or 11 wherein the step of storing information comprises storing in encrypted form the information representative of the desired operational location of the apparatus.

13. A method as claimed in claim 10, 11 or 12 wherein
the step of sensing the location of the apparatus
comprises sensing the apparatus' location via a GPS
5 receiver.

14. A method as claimed in any one of claims 10 to 13
wherein the apparatus comprises a radio
transmitter/receiver.

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15. A method as claimed in any one of claims 10 to 13
wherein the apparatus comprises a cellular telephone.

16. A method as claimed in any one of claims 10 to 13
15 wherein the apparatus comprises broadcast receiving
equipment.

17. A method as claimed in claim 16 wherein the
broadcast receiving equipment comprises a television
20 receiver.

18. A method as claimed in claim 16 wherein the
broadcast receiving equipment comprises a video
recorder.

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19. A method as claimed in any one of claims 16 to 18
wherein the step of sensing the location of the
apparatus comprises sensing the apparatus' location
from data in received broadcast signals.

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20. A method as claimed in any one of claims 10 to 19
wherein the step of sensing the location of the

apparatus comprises sensing the apparatus' location at a random time following operation of the apparatus.

21. A method as claimed in any one of claims 10 to 20
5 wherein the steps of sensing the location of the apparatus and of disabling the apparatus occur during storing in the apparatus of customer-specific information.



Application No: GB 9907530.1
Claims searched: 1 to 21

Examiner: Glyn Hughes
Date of search: 22 August 1999

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.Q): H4L (LDLX, LECX, LDSL, LDSK), G4N (NPL), H4D (DAB, DPBC)
Int Cl (Ed.6): H04Q 7/32, 7/38
Other: Online: EPODOC, WPI, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2329794 A (MOTOROLA) see whole document	1, 5, 6, 10, 14, 15
X	GB 2325592 A (NEC) see whole document	1, 5, 6, 10, 14, 15, 19
X	WO 98/57518 A1 (ERICSSON) see whole document	1, 4, 5, 6, 10, 13, 14, 15, 19
X	WO 98/25433 A1 (ERICSSON) see whole document	1, 4, 5, 6, 10, 13, 14, 15, 19
X	US 5532690 (HERTEL) see whole document	1, 4, 10, 13, 19

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.